

LESSON 5

Objective

Estimate fractional numbers.

Common Core State Standards

- **6.NS.6c** Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

The Number System

Estimating Fractional Numbers

Students at this level are becoming increasingly accomplished in working with fractions, decimals, and percentages. Students should now begin thinking about fractions quantitatively. Practice with estimation, such as is provided in this lesson, helps students solidify their number sense, and it helps them build quantitative reasoning skills. This activity will also help students reinforce their understanding of the relative size of fractions.

Try It! Perform the Try It! activity on the next page.

Talk About It

Discuss the Try It! activity.

- **Ask:** What color cubes did you use to represent the books on jewelry making? The books about pets? The other types of books?
- **Ask:** Did you use any “tricks” or strategies to help you estimate the fractions? If so, what were they?
- **Ask:** What percentage of shelf space is dedicated to each type of book? What are the decimal equivalents of these percentages?

Solve It

Reread the problem with students. Ask students to explain how they made their estimates. They should write a brief note to the library aides with suggestions for making more accurate estimates.

More Ideas

For other ways to teach about estimating fractional numbers—

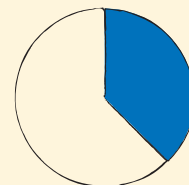
Note that the following activities may be done with decimals and percentages, as well as with fractional parts.

- Have students draw a 10-inch square on a large piece of unlined paper. Have them estimate a fractional part of it (e.g., $\frac{3}{5}$) and sketch in their best guess with a pencil. Students should then check their accuracy by filling in the section they indicated with Color Tiles. This activity may also be done with a square 10 centimeters on a side and Centimeter Cubes.
- Have students repeat the activity using Deluxe Rainbow Fraction® Circles and Rainbow Fraction Circle Rings. Discuss with students which is easier for them—estimating a fractional part of a line (linear estimation), estimating a fractional part of a square (area estimation), or estimating a fractional part of a circle (area estimation).

Formative Assessment

Have students try the following problem.

What portion of this circle is shaded?



- A. $\frac{2}{7}$ B. $\frac{1}{3}$ C. $\frac{3}{8}$ D. $\frac{3}{5}$

Try It!

20 minutes | Groups of 3

Here is a problem about estimating fractional numbers.

Ms. Pérez, the school librarian, is moving books onto some new shelving units. She has asked her aides to reorganize the bookshelves to avoid overcrowding and to leave room for any new titles that might be added later. She has told the aides to fill each shelf this way (see chart). The aides do not have any measuring tools. Can you help them estimate the portion of each shelf to fill?

Type of Book	Portion of Shelf to Use
Fantasy	$\frac{5}{6}$
Jewelry Making	$\frac{7}{10}$
Pets	$\frac{3}{4}$
Sports Biographies	$\frac{2}{5}$
Woodworking	$\frac{2}{3}$

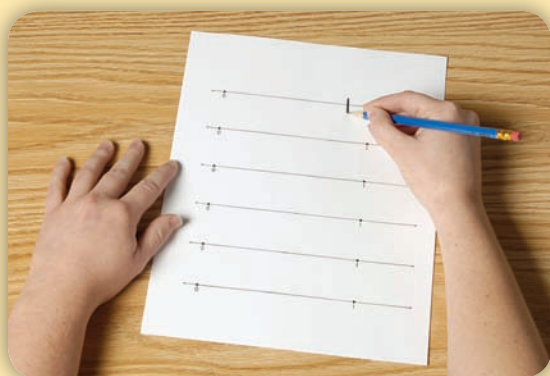


Introduce the problem. Then have students do the activity to solve the problem. Distribute Fraction Tower Equivalency Cubes and number lines to students.

Caution students to ignore the tenon on the bottom of each Fraction Tower Cube, which allows the pieces to be snapped together. It should not be included in the length of the piece.

Materials

- Fraction Tower® Equivalency Cubes
- Fraction Tower Number Lines (BLM 3; 1 per group)



1. Say: Look at the first line segment on the BLM. This will represent the length of the fantasy bookshelf. You can fill the shelf to only $\frac{5}{6}$ of its capacity. Use a pencil to mark where you estimate the books will end.



2. Say: Now check your work. Select the fraction cubes that represent sixths (teal) and stack five of them together. Align them with the zero on the number line. **Ask:** How close was your estimate to the actual amount?



3. Say: Repeat the procedure for the other types of books.

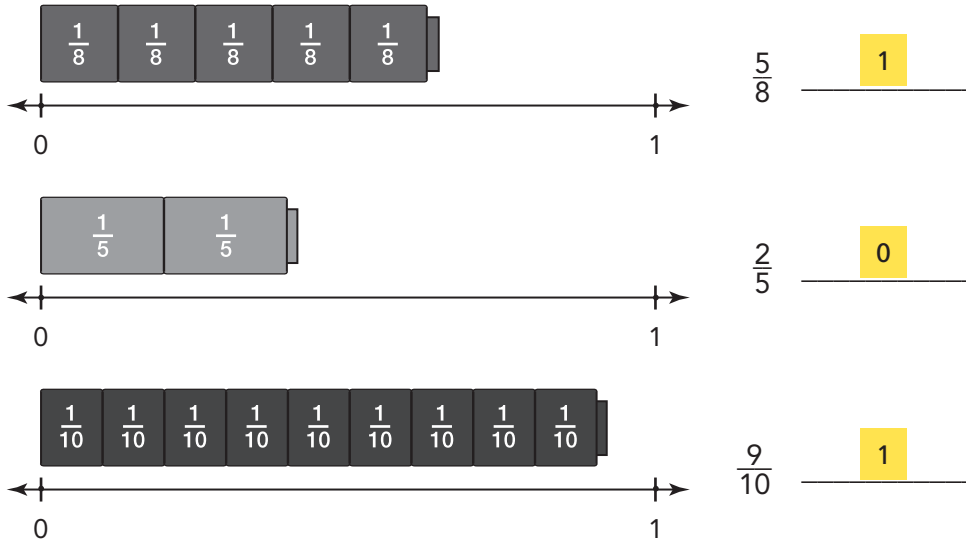
Look Out!

Watch for students who confuse the rules for comparing and ordering whole numbers with those for comparing and ordering fractions. For example, 3 is greater than 2, but $\frac{1}{3}$ is less than $\frac{1}{2}$. Be sure that students are estimating length on the basis of the line segment (between the two points) on the BLM, and not on one or both arrow ends.

Use Fraction Towers to model each fraction on a number line. Tell whether the fraction is closer to 0 or 1.

(Check students' work.)

1.



Using Fraction Towers, model each fraction. Sketch the model on a number line. Tell whether the fraction is closer to 0 or 1.

2. $\frac{5}{12}$ 0

3. $\frac{1}{3}$ 0

Estimate each fraction. Tell whether the fraction is closer to 0 or 1.

4. $\frac{7}{8}$

1

5. $\frac{3}{10}$

0

6. $\frac{3}{4}$

1

7. $\frac{4}{5}$

1

8. $\frac{9}{12}$

1

9. $\frac{2}{6}$

0



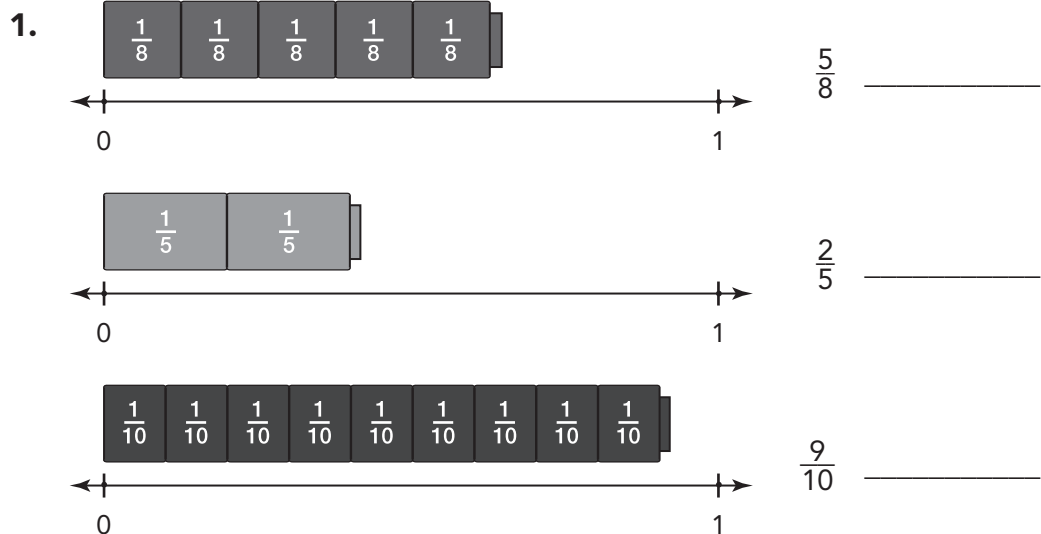
Answer Key

Challenge! How are the rounding rules for fractions similar to the rounding rules for whole numbers?

Challenge: (Sample) When rounding whole numbers, the test number is 5. If a test number is less than 5, you keep the number in the place you are rounding as is. If a number is 5 or greater, you round that number up. For fractions less than 1, the test number is $\frac{1}{2}$. If a fraction is less than $\frac{1}{2}$, you round down to 0. If a fraction is from $\frac{1}{2}$ to 1, you round up.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

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8. $\frac{9}{12}$

9. $\frac{2}{6}$

Name _____

Challenge! How are the rounding rules for fractions similar to the rounding rules for whole numbers?

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slight shadow on the right side, suggesting it's resting on a surface.

Name _____

